CS415 Homework Assignment 1 : Booting and Parsing

1 Problems

1.1 Problem 1

[10 points, easy] What is the purpose of the BIOS in the classical IBM-PC architecture? Explain the relationship between the BIOS, Master Boot Record, and Boot Loader (draw a picture).

1.2 Problem 2

[10 points, easy] What characteristics of the UEFI firmware standard make UEFI PCs more suspectible to the risk of rootkit attacks? How does the standard attempt to minimize this risk?

1.3 Problem 3

[60 points, moderate] One of the most common string processing problems is the 'parsing' problem: taking a string passed to you as input and extracting the different input components from that string. In an upcoming Programming Assignment you are going to need to a parse a string containing an operating system command line.

Write a funciton in C/C++ that has the following signature:

```
char ** parseCommandLine(string aCommandLine)
```

This function takes the input parameter and splits that string up into an array of component tokens that are returned to the caller. As this is assumed to be a Linux command line (for example, from the terminal application), you need to be able to handle certain special cases: (1) file redirection with the `'<'` and `'>'` characters, (2) file redirection with the <<, and (3) the pipe is the only other character used as a seperator. character `|`. Otherwise, you may assume that the any white-space character is a separator.

For example, the following is a valid command in the Bash shell:

```
1 grep x<myfile.textbfin >myfile.out
```

This would be parsed into four tokens: ``grep'', ``x'', ``myfile.in'' and ``myfile.out''.

Your function needs to return a pointer to a dynamically allocated array of C-strings (remembering that a double-pointer is C++ is another way to say that statement). The seemingly odd return type is required by some of the system call code you will use in your first assignment.

An Important Note:

There are multiple ways to solve this problem using the `string` class in C++. If you do apply some Google-Fu and research this question, do make certain you understand what you are being asked to do and avoid blindly copying what you find. Not only because of the academic honesty issues but noting that you need to make certain you correctly address the problem requirements.

2 Submission instructions

You will need to document your submission in a short report that includes responses to questions and any supporting source code. Please attach this report, in PDF format, to your submission in Blackboard.